

SEQUENCE LISTING

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Bowen, David
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<120> DNA SEQUENCES FROM PHOTORHABDUS LUMINESCENS

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<150> US 60/191806

<151> 2000-03-24

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<170> PatentIn version 3.0

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1295						1300					1305			
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1310						1315					1320			
Trp	Gly	Asp	Tyr	Tyr	Leu	Ser	Met	Val	Tyr	Asn	Gly	Asp	Ile	Pro
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Thr	Ile	Asn	Tyr	Lys	Ala	Ala	Ser	Ser	Asp	Leu	Lys	Ile	Tyr	Ile
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1370						1375					1380			
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Thr Asn Ile Asn Ile Thr 1685	Leu Phe Ile Pro Leu 1690	Asp Val Pro 1695
Leu Asn Gln Asp Tyr His 1700	Ala Lys Val Tyr Met 1705	Thr Phe Lys Lys 1710
Ser Pro Ser Asp Gly Thr 1715	Trp Trp Gly Pro His 1720	Phe Val Arg Asp 1725
Asp Lys Gly Ile Val Thr 1730	Ile Asn Pro Lys Ser 1735	Ile Leu Thr His 1740
Phe Glu Ser Val Asn Val 1745	Leu Asn Asn Ile Ser 1750	Ser Glu Pro Met 1755
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Tyr Thr Pro Met Leu Val 1775	Ala Gln Arg Leu Leu 1780	His Glu Gln Asn 1785
Phe Asp Glu Ala Asn Arg 1790	Trp Leu Lys Tyr Val 1795	Trp Ser Pro Ser 1800
Gly Tyr Ile Val His Gly 1805	Gln Ile Gln Asn Tyr 1810	Gln Trp Asn Val 1815
Arg Pro Leu Leu Glu Asp 1820	Thr Ser Trp Asn Ser 1825	Asp Pro Leu Asp 1830
Ser Val Asp Pro Asp Ala 1835	Val Ala Gln His Asp 1840	Pro Met His Tyr 1845
Lys Val Ser Thr Phe Met 1850	Arg Thr Leu Asp Leu 1855	Leu Ile Ala Arg 1860
Gly Asp His Ala Tyr Arg 1865	Gln Leu Glu Arg Asp 1870	Thr Leu Asn Glu 1875
Ala Lys Met Trp Tyr Met 1880	Gln Ala Leu His Leu 1885	Leu Gly Asp Lys 1890
Pro Tyr Leu Pro Leu Ser 1895	Thr Thr Trp Ser Asp 1900	Pro Arg Leu Asp 1905
Arg Ala Ala Asp Ile Thr 1910	Thr Gln Asn Ala His 1915	Asp Ser Ala Ile 1920
Val Ala Leu Arg Gln Asn 1925	Ile Pro Thr Pro Ala 1930	Pro Leu Ser Leu 1935
Arg Ser Ala Asn Thr Leu 1940	Thr Asp Leu Phe Leu 1945	Pro Gln Ile Asn 1950
Glu Val Met Met Asn Tyr 1955	Trp Gln Thr Leu Ala 1960	Gln Arg Val Tyr 1965

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Met	Ser	Leu	Trp	Arg	Phe	Pro	His	Met	Leu	Glu	Asn	Ala	Arg	Gly
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Ile	Glu	Arg	Gln	Asp	Ala	Glu	Ala	Leu	Asn	Ala	Leu	Leu	Gln	Asn
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Gln	Ala	Ala	Glu	Leu	Ile	Leu	Thr	Asn	Leu	Ser	Ile	Gln	Asp	Lys
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Ala	Gly	Ala	Ala	Ala	Asp	Leu	Val	Pro	Asn	Ile	Phe	Gly	Phe	Ala
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Lys	Thr	Ser	Leu	Lys	Thr	Gln	Gln	Glu	Gln	Thr	Gln	Ser	Gln	Leu
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2240						2245					2250			
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Ala Val	Ala Arg Cys Leu Met	Ala Glu Gln Ala Tyr	Arg Trp Glu
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Leu Asn	Asp Asp Ser Ala Arg	Phe Ile Lys Pro Gly	Ala Trp Gln
2285	2290	2295	
Gly Thr	Tyr Ala Gly Leu Leu	Ala Gly Glu Thr Leu	Met Leu Ser
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Leu Ala	Gln Met Glu Asp Ala	His Leu Lys Arg Asp	Lys Arg Ala
2315	2320	2325	
Leu Glu	Val Glu Arg Thr Val	Ser Leu Ala Glu Val	Tyr Ala Gly
2330	2335	2340	
Leu Pro	Lys Asp Asn Gly Pro	Phe Ser Leu Ala Gln	Glu Ile Asp
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Lys Leu	Val Ser Gln Gly Ser	Gly Ser Ala Gly Ser	Gly Asn Asn
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Asn Leu	Ala Phe Gly Ala Gly	Thr Asp Thr Lys Thr	Ser Leu Gln
2375	2380	2385	
Ala Ser	Val Ser Phe Ala Asp	Leu Lys Ile Arg Glu	Asp Tyr Pro
2390	2395	2400	
Ala Ser	Leu Gly Lys Ile Arg	Arg Ile Lys Gln Ile	Ser Val Thr
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Leu Pro	Ala Leu Leu Gly Pro	Tyr Gln Asp Val Gln	Ala Ile Leu
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Ser Tyr	Gly Asp Lys Ala Gly	Leu Ala Asn Gly Cys	Glu Ala Leu
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Ala Val	Ser His Gly Met Asn	Asp Ser Gly Gln Phe	Gln Leu Asp
2450	2455	2460	
Phe Asn	Asp Gly Lys Phe Leu	Pro Phe Glu Gly Ile	Ala Ile Asp
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Gln Gly	Thr Leu Thr Leu Ser	Phe Pro Asn Ala Ser	Met Pro Glu
2480	2485	2490	
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Gly Gly Gly Ala Ile Thr Gly Met Gly Glu Ala Leu Thr Pro Ala Gly	
20 25 30	
ccg gat ggt atg gcc gcc tta tcc ctg cca tta ccc att tcc gcc ggg	144
Pro Asp Gly Met Ala Ala Leu Ser Leu Pro Leu Pro Ile Ser Ala Gly	
35 40 45	
cgt ggt tac gca ccc tcg ctc act ctg aat tac aac agt gga acc ggt	192
Arg Gly Tyr Ala Pro Ser Leu Thr Leu Asn Tyr Asn Ser Gly Thr Gly	
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aac agc cca ttt ggt ctc ggt tgg gac tgc ggc gtc atg gca att cgt	240
Asn Ser Pro Phe Gly Leu Gly Trp Asp Cys Gly Val Met Ala Ile Arg	
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Arg Arg Thr Ser Thr Gly Val Pro Asn Tyr Asp Glu Thr Asp Thr Phe	
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Leu Gly Pro Glu Gly Glu Val Leu Val Val Ala Leu Asn Glu Ala Gly	
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Gln Ala Asp Ile Arg Ser Glu Ser Ser Leu Gln Gly Ile Asn Leu Gly	
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Ala Thr Phe Thr Val Thr Cys Tyr Arg Ser Arg Leu Glu Ser His Phe	
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Asn Arg Leu Glu Tyr Trp Gln Pro Gln Thr Thr Gly Ala Thr Asp Phe	
145 150 155 160	
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Trp Leu Ile Tyr Ser Pro Asp Gly Gln Val His Leu Leu Gly Lys Asn	
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Pro Gln Ala Arg Ile Ser Asn Pro Leu Asn Val Asn Gln Thr Ala Gln	
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Trp Leu Leu Glu Ala Ser Ile Ser Ser His Ser Glu Gln Ile Tyr Tyr	
195 200 205	
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Gln Tyr Arg Ala Glu Asp Glu Ala Gly Cys Glu Thr Asp Glu Leu Ala	
210 215 220	
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Ala His Pro Ser Ala Thr Val Gln Arg Tyr Leu Gln Thr Val His Tyr	
225 230 235 240	
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Pro	Leu	Lys	Ser	Gly	Trp	Met	Phe	Cys	Leu	Val	Phe	Asp	Tyr	Gly	Glu	
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Trp	Leu	Cys	Arg	Lys	Asp	Arg	Phe	Ser	Arg	Tyr	Glu	Tyr	Gly	Phe	Glu	
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Gln	Thr	Leu	Ser	Gly	Gln	Ala	Lys	Gly	Asp	Asp	Glu	Pro	Ala	Leu	Val	
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Ser	Arg	Leu	Ile	Leu	Asp	Tyr	Asp	Glu	Asn	Ala	Met	Val	Ser	Thr	Leu	
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gtt	tct	gtc	cgc	cgg	gta	ggc	cat	gag	gac	aac	aac	acg	gtt	acc	gcg	1104
Val	Ser	Val	Arg	Arg	Val	Gly	His	Glu	Asp	Asn	Asn	Thr	Val	Thr	Ala	
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ctg	cca	cca	ctg	gaa	ctg	gcc	tat	cag	cct	ttt	gag	cca	gaa	caa	acc	1152
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Arg	Trp	Gln	Leu	Leu	Asp	Leu	Lys	Gly	Glu	Gly	Val	Pro	Gly	Ile	Leu	
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Tyr	Gln	Asp	Arg	Asn	Gly	Trp	Trp	Tyr	Arg	Ser	Ala	Gln	Arg	Gln	Ala	
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Thr Leu Arg Tyr Ala His Gly Ala Trp Asp Gly Arg Glu Arg Glu Phe	
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Arg Gly Asp Lys Gln Ala Phe Ala Gly Phe Thr Pro Arg Phe Thr Leu	
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Trp Lys Glu Gly Lys Asp Val Pro Leu Thr Pro Glu Asp Asp His Asn	
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Leu Tyr Trp Leu Asn Arg Ala Leu Lys Gly Gln Pro Leu Arg Ser Glu	
865 870 875 880	
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Ser Pro Val Leu Trp Ala Ser Val Val Glu Ser Arg Ser Tyr His Tyr	
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Thr Cys Arg Gln Ser Ser Trp His His Leu Ile Gly Asn Glu Leu Arg	
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Val Leu Gly Leu Pro Asp Gly Thr Arg Ser Asp Ala Phe Thr Tyr	
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Trp Leu Leu Glu Ala Ser Ile Ser Ser His Ser Glu Gln Ile Tyr Tyr	
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Ala Ser Phe Asn Pro Asp Arg Val His Leu Ala Asp Leu Asp Gly Ser 610 615 620		
Gly Pro Ala Asp Leu Ile Tyr Val His Ala Asp Arg Leu Asp Ile Phe 625 630 635 640		
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Pro Asp Gly Leu Arg Phe Asp Asp Thr Cys Gln Leu Gln Val Ala Asp 660 665 670		
Val Gln Gly Leu Gly Val Val Ser Leu Ile Leu Ser Val Pro His Met 675 680 685		
Ala Pro His His Trp Arg Cys Asp Leu Thr Asn Ala Lys Pro Trp Leu 690 695 700		
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Thr Gly Gln Thr Pro Val Cys Tyr Leu Pro Phe Pro Val His Thr Leu 740 745 750		
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Thr Leu Arg Tyr Ala His Gly Ala Trp Asp Gly Arg Glu Arg Glu Phe 770 775 780		
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Ala Thr Gly Leu Pro Ala Val Asp Asn Ala Leu Ser Ala Gly Tyr Trp 820 825 830		
Arg Gly Asp Lys Gln Ala Phe Ala Gly Phe Thr Pro Arg Phe Thr Leu 835 840 845		
Trp Lys Glu Gly Lys Asp Val Pro Leu Thr Pro Glu Asp Asp His Asn 850 855 860		

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Glu Lys	Pro Phe Ser Pro Pro	Asn Asp Ile Asp Thr	Ala Ile Asn
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Leu Thr	Gly Pro Leu Pro Val	Ala Gln Cys Leu Val	Tyr Ala Pro
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Asp Ser	Trp Met Pro Leu Phe	Ser Gln Glu Thr Phe	Asn Thr Leu
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Thr Gln	Glu Glu Gln Glu Thr	Leu Arg Asp Ser Arg	Ile Ile Thr
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Glu Asp	Trp Arg Ile Cys Ala	Leu Thr Arg Arg Arg	Trp Leu Gln
1295		1300	1305
Ser Gln	Lys Ile Ser Thr Pro	Leu Val Lys Leu Leu	Thr Asn Ser
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Ile Gly	Leu Pro Pro His Asn	Leu Thr Leu Thr Thr	Asp Arg Tyr
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Asp Arg	Asp Ser Glu Gln Gln	Ile Arg Gln Gln Val	Ala Phe Ser
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Asp Gly	Phe Gly Arg Leu Leu	Gln Ala Ser Val Arg	His Glu Ala
1355		1360	1365
Gly Glu	Ala Trp Gln Arg Asn	Gln Asp Gly Ser Leu	Val Thr Lys
1370		1375	1380
Val Glu	Asn Thr Lys Thr Arg	Trp Ala Val Thr Gly	Arg Thr Glu
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Tyr Asp	Asn Lys Gly Gln Thr	Ile Arg Thr Tyr Gln	Pro Tyr Phe
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Leu Asn	Asp Trp Arg Tyr Val	Ser Asp Asp Ser Ala	Arg Lys Glu
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Ala Tyr	Ala Asp Thr His Ile	Tyr Asp Pro Ile Gly	Arg Glu Ile
1430		1435	1440
Arg Val	Ile Thr Ala Lys Gly	Trp Leu Arg Gln Ser	Gln Tyr Phe
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Thr Gln Ala Asp Glu Asn Ser Asp Glu Leu Ile Thr Phe Tyr Glu Phe
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aat att ccg gga ttt cag gta aaa agc acc gat cct cgt aaa aat aaa      192
Asn Ile Pro Gly Phe Gln Val Lys Ser Thr Asp Pro Arg Lys Asn Lys
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Val Leu Arg Glu Glu Ser Val Asp Ala Gly Arg Thr Ile Thr Leu Asn
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caa aac cat cgt tat gaa gat aac acc ctt ccc ggt cgt ctg ctc gct      384
Gln Asn His Arg Tyr Glu Asp Asn Thr Leu Pro Gly Arg Leu Leu Ala
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atc acc gaa caa gta cag gca gga gag aaa acg acc gaa cgt ctt atc      432
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tgg gcc ggc aat acg ccg caa gaa aaa gat tac aac ctc gcc ggt cag      480
Trp Ala Gly Asn Thr Pro Gln Glu Lys Asp Tyr Asn Leu Ala Gly Gln
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tgt gtc cgc cat tac gat acc gcg gga ctt act caa ctc aat agc ctt      528
Cys Val Arg His Tyr Asp Thr Ala Gly Leu Thr Gln Leu Asn Ser Leu
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tct ctg gct ggc gtc gtg cta tca caa tct caa caa ctg ctt acc gat      576
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Gly Gln Lys Leu Arg Glu Glu His Gly Asn Gly Ile Val Thr Glu Tyr	
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Ser Tyr Glu Pro Glu Thr Gln Arg Leu Ile Gly Ile Thr Thr Arg Arg	
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Pro Ser Asp Ala Lys Val Leu Gln Asp Leu Arg Tyr Gln Tyr Asp Pro	
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Ser Gly Lys Glu Arg Asp Ala Thr Gly Leu Tyr Tyr Tyr Gly Tyr Arg	
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Tyr Tyr Gln Pro Trp Ala Gly Arg Trp Leu Ser Ala Asp Pro Ala Gly	
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Asn Lys Ser Leu Lys Val Val Arg Val Gly Asp Ser Asp Pro Ser Gly			
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Tyr Leu Leu Ser His Glu Glu Leu Leu Lys Gly Ile Glu Lys Ser Gln			
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Ile Ile Tyr Ser Arg Leu Glu Glu Asn Ser Ser Leu Ser Glu Lys Ser			
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Lys Thr Asn Leu Ser Leu Gly Ser Glu Ile Ser Gly Tyr Met Ala Arg			
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Asn Gln Ser Gly Pro Asn Phe Ile Arg Val Phe Asn Leu Ala Gly Gln
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Asp Ile Glu Ser Arg Pro Val Leu Ile Ile Asn Ala Thr Gly Val Arg
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Gln Asn His Arg Tyr Glu Asp Asn Thr Leu Pro Gly Arg Leu Leu Ala
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Cys Val Arg His Tyr Asp Thr Ala Gly Leu Thr Gln Leu Asn Ser Leu
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Gly	Thr	Arg	Gln	Met	Leu	Gly	Phe	Ile	Gln	Gly	Tyr	Ser	Asp	Leu	Phe	85	90	95	
Gly	Asn	Arg	Ala	Asp	Asn	Tyr	Ala	Ala	Pro	Gly	Ser	Val	Ala	Ser	Met	100	105	110	
Phe	Ser	Pro	Ala	Ala	Tyr	Leu	Thr	Glu	Leu	Tyr	Arg	Glu	Ala	Lys	Asn	115	120	125	
Leu	His	Asp	Ser	Ser	Ser	Ile	Tyr	Tyr	Leu	Asp	Lys	Arg	Arg	Pro	Asp	130	135	140	
Leu	Ala	Ser	Leu	Met	Leu	Ser	Gln	Lys	Asn	Met	Asp	Glu	Glu	Ile	Ser	145	150	155	160
Thr	Leu	Ala	Leu	Ser	Asn	Glu	Leu	Cys	Leu	Ala	Gly	Ile	Glu	Thr	Lys	165	170	175	

Thr Gly Lys Ser Gln Asp Glu Val Met Asp Met Leu Ser Thr Tyr Arg
 180 185 190
 Leu Ser Gly Glu Thr Pro Tyr His His Ala Tyr Glu Thr Val Arg Glu
 195 200 205
 Ile Val His Glu Arg Asp Pro Gly Phe Arg His Leu Ser Gln Ala Pro
 210 215 220
 Ile Val Ala Ala Lys Leu Asp Pro Val Thr Leu Leu Gly Ile Ser Ser
 225 230 235 240
 His Ile Ser Pro Glu Leu Tyr Asn Leu Leu Ile Glu Glu Ile Pro Glu
 245 250 255
 Lys Asp Glu Ala Ala Leu Asp Thr Leu Tyr Lys Thr Asn Phe Gly Asp
 260 265 270
 Ile Thr Thr Ala Gln Leu Met Ser Pro Ser Tyr Leu Ala Arg Tyr Tyr
 275 280 285
 Gly Val Ser Pro Glu Asp Ile Ala Tyr Val Thr Thr Ser Leu Ser His
 290 295 300
 Val Gly Tyr Ser Ser Asp Ile Leu Val Ile Pro Leu Val Asp Gly Val
 305 310 315 320
 Gly Lys Met Glu Val Val Arg Val Thr Arg Thr Pro Ser Asp Asn Tyr
 325 330 335
 Thr Ser Gln Thr Asn Tyr Ile Glu Leu Tyr Pro Gln Gly Gly Asp Asn
 340 345 350
 Tyr Leu Ile Lys Tyr Asn Leu Ser Asn Ser Phe Gly Leu Asp Asp Phe
 355 360 365
 Tyr Leu Gln Tyr Lys Asp Gly Ser Ala Asp Trp Thr Glu Ile Ala His
 370 375 380
 Asn Pro Tyr Pro Asp Met Val Ile Asn Gln Lys Tyr Glu Ser Gln Ala
 385 390 395 400
 Thr Ile Lys Arg Ser Asp Ser Asp Asn Ile Leu Ser Ile Gly Leu Gln
 405 410 415
 Arg Trp His Ser Gly Ser Tyr Asn Phe Ala Ala Ala Asn Phe Lys Ile
 420 425 430
 Asp Gln Tyr Ser Pro Lys Ala Phe Leu Leu Lys Met Asn Lys Ala Ile
 435 440 445
 Arg Leu Leu Lys Ala Thr Gly Leu Ser Phe Ala Thr Leu Glu Arg Ile
 450 455 460
 Val Asp Ser Val Asn Ser Thr Lys Ser Ile Thr Val Glu Val Leu Asn
 465 470 475 480
 Lys Val Tyr Arg Val Lys Phe Tyr Ile Asp Arg Tyr Gly Ile Ser Glu
 485 490 495
 Glu Thr Ala Ala Ile Leu Ala Asn Ile Asn Ile Ser Gln Gln Ala Val

500					505					510					
Gly	Asn	Gln	Leu	Ser	Gln	Phe	Glu	Gln	Leu	Phe	Asn	His	Pro	Pro	Leu
	515						520				525				
Asn	Gly	Ile	Arg	Tyr	Glu	Ile	Ser	Glu	Asp	Asn	Ser	Lys	His	Leu	Pro
	530				535					540					
Asn	Pro	Asp	Leu	Asn	Leu	Lys	Pro	Asp	Ser	Thr	Gly	Asp	Asp	Gln	Arg
545					550					555					560
Lys	Ala	Val	Leu	Lys	Arg	Ala	Phe	Gln	Val	Asn	Ala	Ser	Glu	Leu	Tyr
				565					570					575	
Gln	Met	Leu	Leu	Ile	Thr	Asp	Arg	Lys	Glu	Asp	Gly	Val	Ile	Lys	Asn
			580					585					590		
Asn	Leu	Glu	Asn	Leu	Ser	Asp	Leu	Tyr	Leu	Val	Ser	Leu	Leu	Ala	Gln
		595					600				605				
Ile	His	Asn	Leu	Thr	Ile	Ala	Glu	Leu	Asn	Ile	Leu	Leu	Val	Ile	Cys
	610				615					620					
Gly	Tyr	Gly	Asp	Thr	Asn	Ile	Tyr	Gln	Ile	Thr	Asp	Asp	Asn	Leu	Ala
625					630					635					640
Lys	Ile	Val	Glu	Thr	Leu	Leu	Trp	Ile	Thr	Gln	Trp	Leu	Lys	Thr	Gln
				645					650					655	
Lys	Trp	Thr	Val	Thr	Asp	Leu	Phe	Leu	Met	Thr	Thr	Ala	Thr	Tyr	Ser
			660					665					670		
Thr	Thr	Leu	Thr	Pro	Glu	Ile	Ser	Asn	Leu	Thr	Ala	Thr	Leu	Ser	Ser
			675				680					685			
Thr	Leu	His	Gly	Lys	Glu	Ser	Leu	Ile	Gly	Glu	Asp	Leu	Lys	Arg	Ala
	690					695					700				
Met	Ala	Pro	Cys	Phe	Thr	Ser	Ala	Leu	His	Leu	Thr	Ser	Gln	Glu	Val
705					710					715					720
Ala	Tyr	Asp	Leu	Leu	Leu	Trp	Ile	Asp	Gln	Ile	Gln	Pro	Ala	Gln	Ile
				725					730					735	
Thr	Val	Asp	Gly	Phe	Trp	Glu	Glu	Val	Gln	Thr	Thr	Pro	Thr	Ser	Leu
			740				745					750			
Lys	Val	Ile	Thr	Phe	Ala	Gln	Val	Leu	Ala	Gln	Leu	Ser	Leu	Ile	Tyr
		755					760					765			
Arg	Arg	Ile	Gly	Leu	Ser	Glu	Thr	Glu	Leu	Ser	Leu	Ile	Val	Thr	Gln
	770					775					780				
Ser	Ser	Leu	Leu	Val	Ala	Gly	Lys	Ser	Ile	Leu	Asp	His	Gly	Leu	Leu
785					790					795					800
Thr	Leu	Met	Ala	Leu	Glu	Gly	Phe	His	Thr	Trp	Val	Asn	Gly	Leu	Gly
				805					810					815	
Gln	His	Ala	Ser	Leu	Ile	Leu	Ala	Ala	Leu	Lys	Asp	Gly	Ala	Leu	Thr
			820					825					830		

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Arg	Pro	Val	Val	Tyr	Met	Ser	Arg	Leu	Tyr	Leu	Leu	Trp	Leu	Glu
1145						1150					1155			
Gln	Gln	Ser	Lys	Lys	Ser	Asp	Asp	Gly	Lys	Thr	Thr	Ile	Tyr	Gln
1160						1165					1170			
Tyr	Asn	Leu	Lys	Leu	Ala	His	Ile	Arg	Tyr	Asp	Gly	Ser	Trp	Asn
1175						1180					1185			
Thr	Pro	Phe	Thr	Phe	Asp	Val	Thr	Glu	Lys	Val	Lys	Asn	Tyr	Thr
1190						1195					1200			
Ser	Ser	Thr	Asp	Ala	Ala	Glu	Ser	Leu	Gly	Leu	Tyr	Cys	Thr	Gly
1205						1210					1215			
Tyr	Gln	Gly	Glu	Asp	Thr	Leu	Leu	Val	Met	Phe	Tyr	Ser	Met	Gln
1220						1225					1230			
Ser	Ser	Tyr	Ser	Ser	Tyr	Thr	Asp	Asn	Asn	Ala	Pro	Val	Thr	Gly
1235						1240					1245			
Leu	Tyr	Ile	Phe	Ala	Asp	Met	Ser	Ser	Asp	Asn	Met	Thr	Asn	Ala
1250						1255					1260			
Gln	Ala	Thr	Asn	Tyr	Trp	Asn	Asn	Ser	Tyr	Pro	Gln	Phe	Asp	Thr
1265						1270					1275			
Val	Met	Ala	Asp	Pro	Asp	Ser	Asp	Asn	Lys	Lys	Val	Ile	Thr	Arg
1280						1285					1290			
Arg	Val	Asn	Asn	Arg	Tyr	Ala	Glu	Asp	Tyr	Glu	Ile	Pro	Ser	Ser
1295						1300					1305			
Val	Thr	Ser	Asn	Ser	Asn	Tyr	Ser	Trp	Gly	Asp	His	Ser	Leu	Thr
1310						1315					1320			
Met	Leu	Tyr	Gly	Gly	Ser	Val	Pro	Asn	Ile	Thr	Phe	Glu	Ser	Ala
1325						1330					1335			
Ala	Glu	Asp	Leu	Arg	Leu	Ser	Thr	Asn	Met	Ala	Leu	Ser	Ile	Ile
1340						1345					1350			
His	Asn	Gly	Tyr	Ala	Gly	Thr	Arg	Arg	Ile	Gln	Cys	Asn	Leu	Met
1355						1360					1365			
Lys	Gln	Tyr	Ala	Ser	Leu	Gly	Asp	Lys	Phe	Ile	Ile	Tyr	Asp	Ser
1370						1375					1380			
Ser	Phe	Asp	Asp	Ala	Asn	Arg	Phe	Asn	Leu	Val	Pro	Leu	Phe	Lys
1385						1390					1395			
Phe	Gly	Lys	Asp	Glu	Asn	Ser	Asp	Asp	Ser	Ile	Cys	Ile	Tyr	Asn
1400						1405					1410			
Glu	Asn	Pro	Ser	Ser	Glu	Asp	Lys	Lys	Trp	Tyr	Phe	Ser	Ser	Lys
1415						1420					1425			
Asp	Asp	Asn	Lys	Thr	Ala	Asp	Tyr	Asn	Gly	Gly	Thr	Gln	Cys	Ile
1430						1435					1440			
Asp	Ala	Gly	Thr	Ser	Asn	Lys	Asp	Phe	Tyr	Tyr	Asn	Leu	Gln	Glu

1445	1450	1455
Ile Glu Val Ile Ser Val Thr	Gly Gly Tyr Trp Ser	Ser Tyr Lys
1460	1465	1470
Ile Ser Asn Pro Ile Asn Ile	Asn Thr Gly Ile Asp	Ser Ala Lys
1475	1480	1485
Val Lys Val Thr Val Lys Ala	Gly Gly Asp Asp Gln	Ile Phe Thr
1490	1495	1500
Ala Asp Asn Ser Thr Tyr Val	Pro Gln Gln Pro Ala	Pro Ser Phe
1505	1510	1515
Glu Glu Met Ile Tyr Gln Phe	Asn Asn Leu Thr Ile	Asp Cys Lys
1520	1525	1530
Asn Leu Asn Phe Ile Asp Asn	Gln Ala His Ile Glu	Ile Asp Phe
1535	1540	1545
Thr Ala Thr Ala Gln Asp Gly	Arg Phe Leu Gly Ala	Glu Thr Phe
1550	1555	1560
Ile Ile Pro Val Thr Lys Lys	Val Leu Gly Thr Glu	Asn Val Ile
1565	1570	1575
Ala Leu Tyr Ser Glu Asn Asn	Gly Val Gln Tyr Met	Gln Ile Gly
1580	1585	1590
Ala Tyr Arg Thr Arg Leu Asn	Thr Leu Phe Ala Gln	Gln Leu Val
1595	1600	1605
Ser Arg Ala Asn Arg Gly Ile	Asp Ala Val Leu Ser	Met Glu Thr
1610	1615	1620
Gln Asn Ile Gln Glu Pro Gln	Leu Gly Ala Gly Thr	Tyr Val Gln
1625	1630	1635
Leu Val Leu Asp Lys Tyr Asp	Glu Ser Ile His Gly	Thr Asn Lys
1640	1645	1650
Ser Phe Ala Ile Glu Tyr Val	Asp Ile Phe Lys Glu	Asn Asp Ser
1655	1660	1665
Phe Val Ile Tyr Gln Gly Glu	Leu Ser Glu Thr Ser	Gln Thr Val
1670	1675	1680
Val Lys Val Phe Leu Ser Tyr	Phe Ile Glu Ala Thr	Gly Asn Lys
1685	1690	1695
Asn His Leu Trp Val Arg Ala	Lys Tyr Gln Lys Glu	Thr Thr Asp
1700	1705	1710
Lys Ile Leu Phe Asp Arg Thr	Asp Glu Lys Asp Pro	His Gly Trp
1715	1720	1725
Phe Leu Ser Asp Asp His Lys	Thr Phe Ser Gly Leu	Ser Ser Ala
1730	1735	1740
Gln Ala Leu Lys Asn Asp Ser	Glu Pro Met Asp Phe	Ser Gly Ala
1745	1750	1755

Asn	Ala	Leu	Tyr	Phe	Trp	Glu	Leu	Phe	Tyr	Tyr	Thr	Pro	Met	Met
1760						1765					1770			
Met	Ala	His	Arg	Leu	Leu	Gln	Glu	Gln	Asn	Phe	Asp	Ala	Ala	Asn
1775						1780					1785			
His	Trp	Phe	Arg	Tyr	Val	Trp	Ser	Pro	Ser	Gly	Tyr	Ile	Val	Asp
1790						1795					1800			
Gly	Lys	Ile	Ala	Ile	Tyr	His	Trp	Asn	Val	Arg	Pro	Leu	Glu	Glu
1805						1810					1815			
Asp	Thr	Ser	Trp	Asn	Ala	Gln	Gln	Leu	Asp	Ser	Thr	Asp	Pro	Asp
1820						1825					1830			
Ala	Val	Ala	Gln	Asp	Asp	Pro	Met	His	Tyr	Lys	Val	Ala	Thr	Phe
1835						1840					1845			
Met	Ala	Thr	Leu	Asp	Leu	Leu	Met	Ala	Arg	Gly	Asp	Ala	Ala	Tyr
1850						1855					1860			
Arg	Gln	Leu	Glu	Arg	Asp	Thr	Leu	Ala	Glu	Ala	Lys	Met	Trp	Tyr
1865						1870					1875			
Thr	Gln	Ala	Leu	Asn	Leu	Leu	Gly	Asp	Glu	Pro	Gln	Val	Met	Leu
1880						1885					1890			
Ser	Thr	Thr	Trp	Ala	Asn	Pro	Thr	Leu	Gly	Asn	Ala	Ala	Ser	Lys
1895						1900					1905			
Thr	Thr	Gln	Gln	Val	Arg	Gln	Gln	Val	Leu	Thr	Gln	Leu	Arg	Leu
1910						1915					1920			
Asn	Ser	Arg	Val	Lys	Thr	Pro	Leu	Leu	Gly	Thr	Ala	Asn	Ser	Leu
1925						1930					1935			
Thr	Ala	Leu	Phe	Leu	Pro	Gln	Glu	Asn	Ser	Lys	Leu	Lys	Gly	Tyr
1940						1945					1950			
Trp	Arg	Thr	Leu	Ala	Gln	Arg	Met	Phe	Asn	Leu	Arg	His	Asn	Leu
1955						1960					1965			
Ser	Ile	Asp	Gly	Gln	Pro	Leu	Ser	Leu	Pro	Leu	Tyr	Ala	Lys	Pro
1970						1975					1980			
Ala	Asp	Pro	Lys	Ala	Leu	Leu	Ser	Ala	Ala	Val	Ser	Ala	Ser	Gln
1985						1990					1995			
Gly	Gly	Ala	Asp	Leu	Pro	Lys	Ala	Pro	Leu	Thr	Ile	His	Arg	Phe
2000						2005					2010			
Pro	Gln	Met	Leu	Glu	Gly	Ala	Arg	Gly	Leu	Val	Asn	Gln	Leu	Ile
2015						2020					2025			
Gln	Phe	Gly	Ser	Ser	Leu	Leu	Gly	Tyr	Ser	Glu	Arg	Gln	Asp	Ala
2030						2035					2040			
Glu	Ala	Met	Ser	Gln	Leu	Leu	Gln	Thr	Gln	Ala	Ser	Glu	Leu	Ile
2045						2050					2055			

Leu Thr	Ser Ile Arg Met	Gln	Asp Asn Gln Leu	Ala	Glu Leu Asp
2060		2065		2070	
Ser Glu	Lys Thr Ala Leu	Gln	Val Ser Leu Ala	Gly	Val Gln Gln
2075		2080		2085	
Arg Phe	Asp Ser Tyr Ser	Gln	Leu Tyr Glu Glu	Asn	Ile Asn Ala
2090		2095		2100	
Gly Glu	Gln Arg Ala Leu	Ala	Leu Arg Ser Glu	Ser	Ala Ile Glu
2105		2110		2115	
Ser Gln	Gly Ala Gln Ile	Ser	Arg Met Ala Gly	Ala	Gly Val Asp
2120		2125		2130	
Met Ala	Pro Asn Ile Phe	Gly	Leu Ala Asp Gly	Gly	Met His Tyr
2135		2140		2145	
Gly Ala	Ile Ala Tyr Ala	Ile	Ala Asp Gly Ile	Glu	Leu Ser Ala
2150		2155		2160	
Ser Ala	Lys Met Val Asp	Ala	Glu Lys Val Ala	Gln	Ser Glu Ile
2165		2170		2175	
Tyr Arg	Arg Arg Arg Gln	Glu	Trp Lys Ile Gln	Arg	Asp Asn Ala
2180		2185		2190	
Gln Ala	Glu Ile Asn Gln	Leu	Asn Ala Gln Leu	Glu	Ser Leu Ser
2195		2200		2205	
Ile Arg	Arg Glu Ala Ala	Glu	Met Gln Lys Glu	Tyr	Leu Lys Thr
2210		2215		2220	
Gln Gln	Ala Gln Ala Gln	Ala	Gln Leu Thr Phe	Leu	Arg Ser Lys
2225		2230		2235	
Phe Ser	Asn Gln Ala Leu	Tyr	Ser Trp Leu Arg	Gly	Arg Leu Ser
2240		2245		2250	
Gly Ile	Tyr Phe Gln Phe	Tyr	Asp Leu Ala Val	Ser	Arg Cys Leu
2255		2260		2265	
Met Ala	Glu Gln Ser Tyr	Gln	Trp Glu Ala Asn	Asp	Asn Ser Ile
2270		2275		2280	
Ser Phe	Val Lys Pro Gly	Ala	Trp Gln Gly Thr	Tyr	Ala Gly Leu
2285		2290		2295	
Leu Cys	Gly Glu Ala Leu	Ile	Gln Asn Leu Ala	Gln	Met Glu Glu
2300		2305		2310	
Ala Tyr	Leu Lys Trp Glu	Ser	Arg Ala Leu Glu	Val	Glu Arg Thr
2315		2320		2325	
Val Ser	Leu Ala Val Val	Tyr	Asp Ser Leu Glu	Gly	Asn Asp Arg
2330		2335		2340	
Phe Asn	Leu Ala Glu Gln	Ile	Pro Ala Leu Leu	Asp	Lys Gly Glu
2345		2350		2355	
Gly Thr	Ala Gly Thr Lys	Glu	Asn Gly Leu Ser	Leu	Ala Asn Ala

2360					2365					2370				
Ile	Leu	Ser	Ala	Ser	Val	Lys	Leu	Ser	Asp	Leu	Lys	Leu	Gly	Thr
2375						2380					2385			
Asp	Tyr	Pro	Asp	Ser	Ile	Val	Gly	Ser	Asn	Lys	Val	Arg	Arg	Ile
2390						2395					2400			
Lys	Gln	Ile	Ser	Val	Ser	Leu	Pro	Ala	Leu	Val	Gly	Pro	Tyr	Gln
2405						2410					2415			
Asp	Val	Gln	Ala	Met	Leu	Ser	Tyr	Gly	Gly	Ser	Thr	Gln	Leu	Pro
2420						2425					2430			
Lys	Gly	Cys	Ser	Ala	Leu	Ala	Val	Ser	His	Gly	Thr	Asn	Asp	Ser
2435						2440					2445			
Gly	Gln	Phe	Gln	Leu	Asp	Phe	Asn	Asp	Gly	Lys	Tyr	Leu	Pro	Phe
2450						2455					2460			
Glu	Gly	Ile	Ala	Leu	Asp	Asp	Gln	Gly	Thr	Leu	Asn	Leu	Gln	Phe
2465						2470					2475			
Pro	Asn	Ala	Thr	Asp	Lys	Gln	Lys	Ala	Ile	Leu	Gln	Thr	Met	Ser
2480						2485					2490			
Asp	Ile	Ile	Leu	His	Ile	Arg	Tyr	Thr	Ile	Arg				
2495						2500								